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### An ergonomic analysis of vacuum cleaning tasks using observational risk assessment tools

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# **An Ergonomic Analysis of Vacuum Cleaning Tasks Using Observational Risk Assessment Tools**

A thesis submitted in fulfilment of the  
requirements for the award of the degree of

**Master of Science (Research)**

from

**University of Wollongong**

by

**Alison Bell**

B. App. Sc. (O.T.)

Grad. Dip. Safety Sc.

Grad. Cert. Health Sc. (Education)

**School of Health Sciences**

**2008**

# **Certification**

I, Alison Bell, declare that this thesis, submitted in fulfilment of the requirements for the award of Master of Science (Research), in the School of Health Sciences, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution. Copies of the original data analysed within this thesis are held by the School of Health Sciences, University of Wollongong.

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Alison Bell

11 June 2008

# **Dedication**

I would like to dedicate this thesis to my husband, Robert Edgar, and my children, Elizabeth and Callum, who have shown extraordinary patience, understanding and resilience through my perpetual quest for further study. Without their support, this thesis would never have been written. I would also like to dedicate this thesis to the memory of my mother, who always told me to do my best, and passed away before this thesis could be completed.

# Acknowledgments

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- Professor Julie Steele, my Supervisor and academic mentor, for her encouragement, guidance and advice;
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- Dr Bridget Munro for her encouragement and words of wisdom;
- Dr Pam Davies for her knowledge of statistics and willingness to share it;  
and
- Ms Fiona Weigall, my colleague and friend, for her technical skills and analytical mind.

# **Abstract**

This research thesis examined the risk of upper limb musculoskeletal disorders for cleaning workers while performing vacuum cleaning tasks in the normal course of their employment. The cleaning workers in this study were from three sectors of the workforce – government schools, hospitality and commercial office space. The vacuum cleaning tasks were divided into those performed with a back pack style vacuum cleaning machine and those using a canister/barrel machine. Three observational risk assessment tools were selected to measure the risk of these tasks to cleaning workers. The selected tools were the Manual Tasks Risk Assessment Tool (ManTRA) version 2.0; the Quick Exposure Check (QEC) (Li & Buckle, 1998); and the Rapid Upper Limb Assessment tool (RULA) (McAtamney & Corlett, 1993).

Results of this thesis study demonstrated that vacuum cleaning is a risk to the musculoskeletal health of cleaning workers, with some variation between the tool ratings, reflecting the specificity and/or sensitivity of each tool. Differences were found between the three cleaning sectors in terms of overall risk posed by vacuum cleaning tasks. The sector with the greatest risk was found to be the government school cleaners, followed by the hospitality and then commercial office space cleaning sectors.

The ‘risk experience’ difference between the sectors cannot be attributed only to vacuum cleaner characteristics, but also, the environment and length of shift worked by the cleaning staff. Further research is required to determine the difference in risk exposure between the two types of vacuum cleaner (back pack and canister).

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